Fig. 1

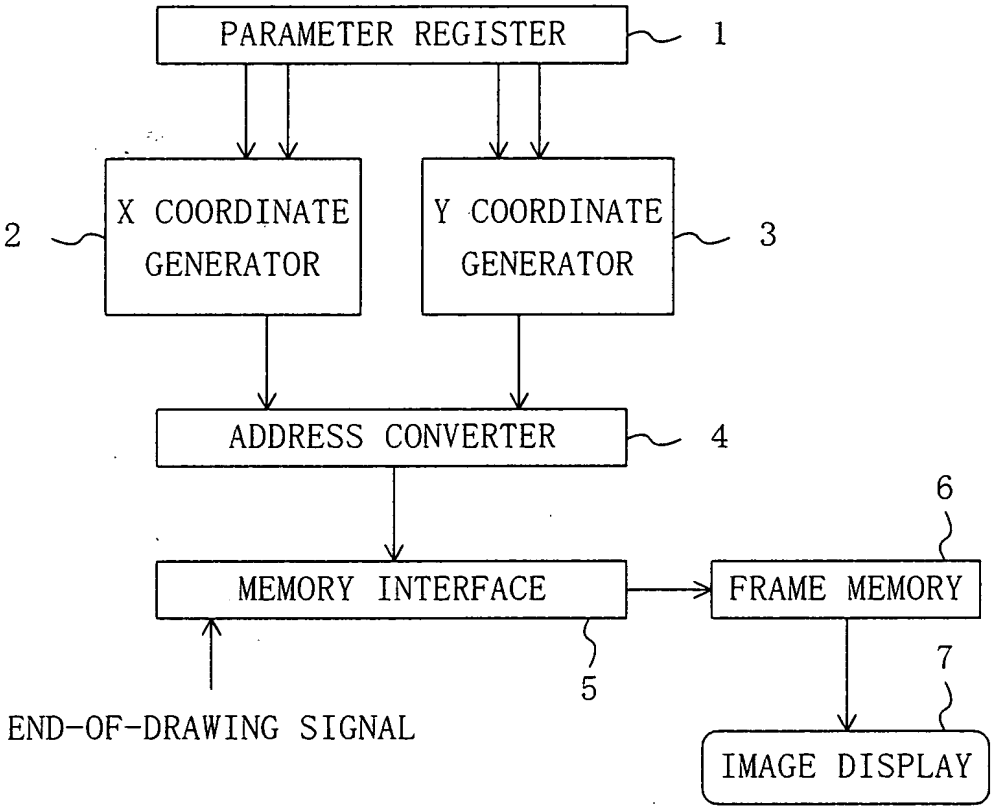
PARAMETER REGISTER
1
X COORDINATE GENERATOR
2
Y COORDINATE GENERATOR
3
ADDRESS CONVERTER
4
MEMORY INTERFACE
5
FRAME MEMORY
6
IMAGE DISPLAY
7
END-OF-DRAWING SIGNAL

Fig. 2

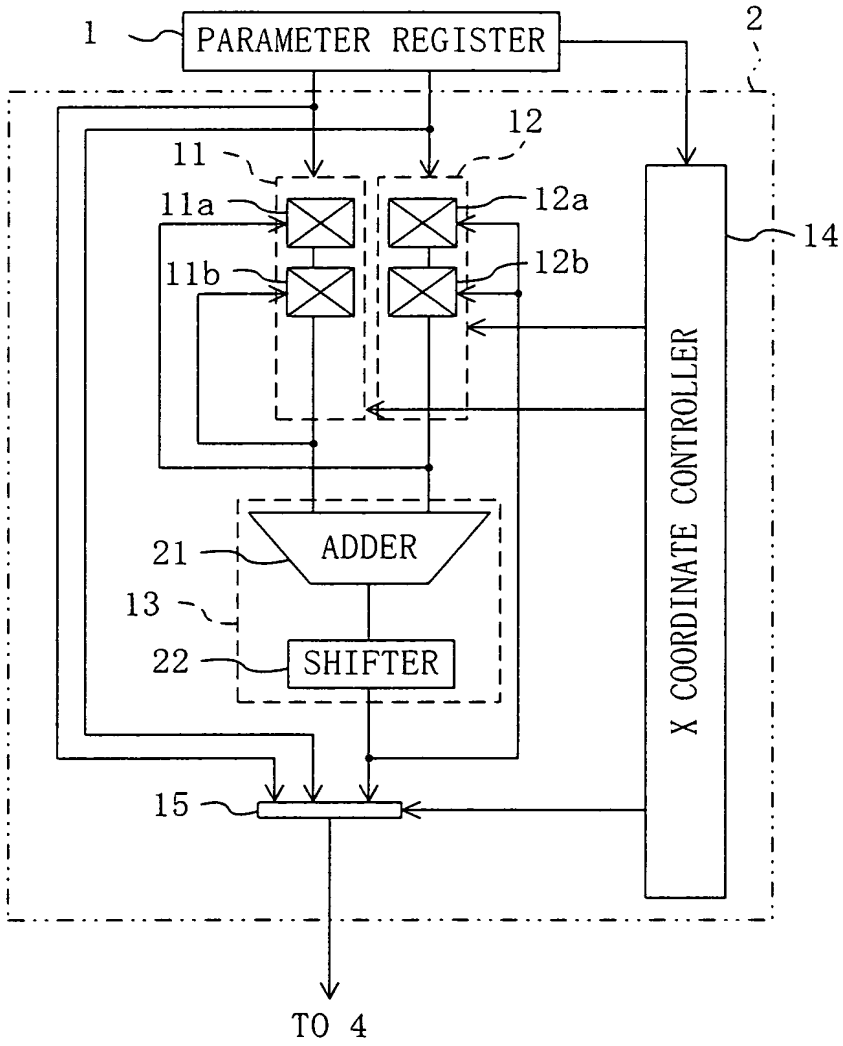
1
PARAMETER REGISTER
2
12
11
11a
12a
14
11b
12b
X COORDINATE CONTROLLER
21
ADDER
13
22
SHIFTER
15
TO 4

Fig. 3

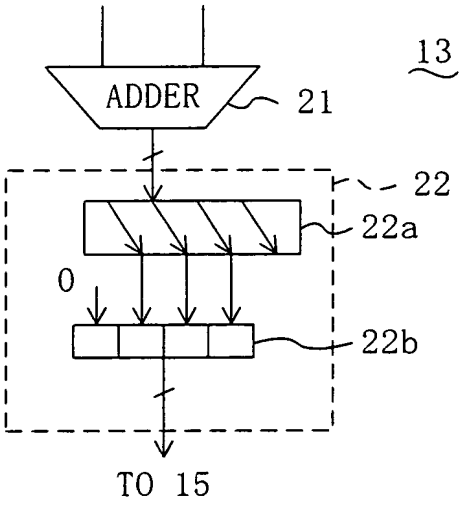
13
ADDER
21
22
22a
0
22b
TO 15

Fig. 4

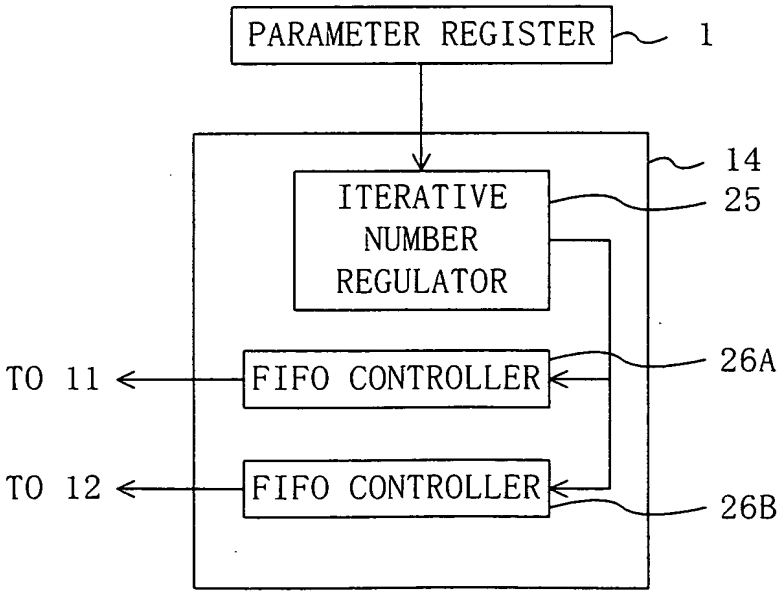
PARAMETER REGISTER
1
14
ITERATIVE NUMBER REGULATOR
25
TO 11
FIFO CONTROLLER
26A
TO 12
FIFO CONTROLLER
26B

Fig. 5

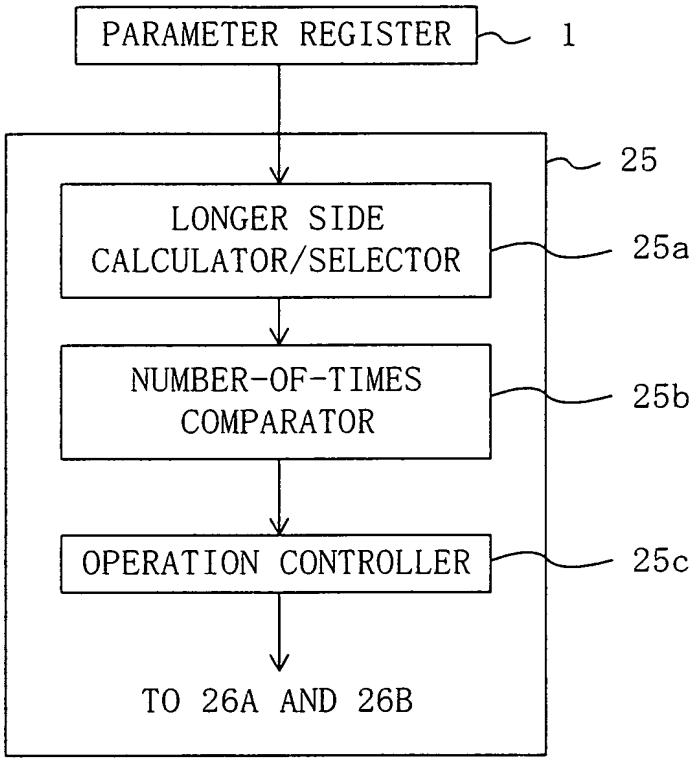
PARAMETER REGISTER
1
25
LONGER SIDE CALCULATOR/SELECTOR
25a
NUMBER-OF-TIMES COMPARATOR
25b
OPERATION CONTROLLER
25c
TO 26A AND 26B

Fig. 6

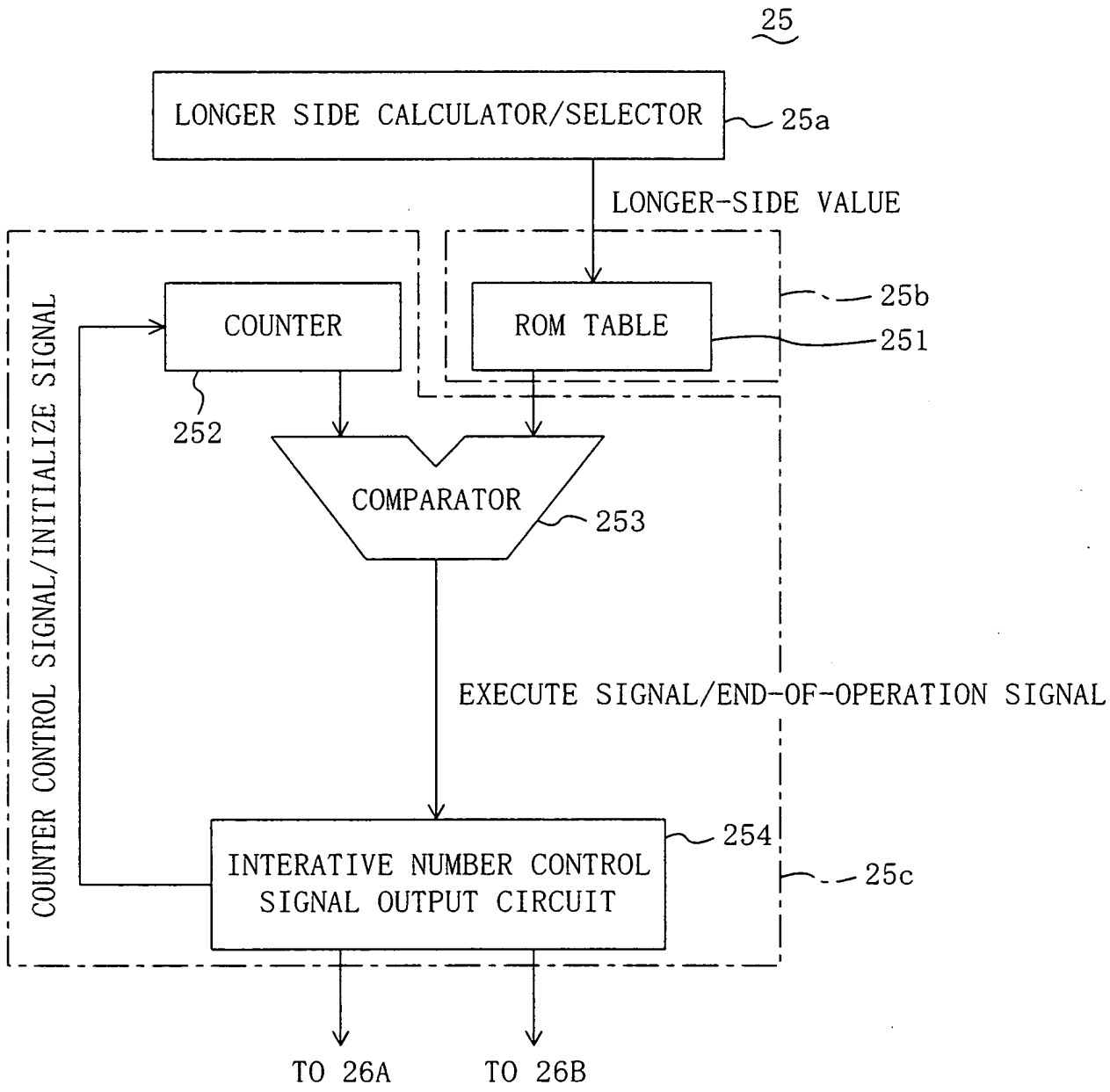
25
LONGER SIDE CALCULATOR/SELECTOR
25a
LONGER-SIDE VALUE
COUNTER
ROM TABLE
25b
251
252
COMPARATOR
253
COUNTER CONTROL SIGNAL/INITIALIZE SIGNAL
EXECUTE SIGNAL/END-OF-OPERATION SIGNAL
INTERATIVE NUMBER CONTROL SIGNAL OUTPUT CIRCUIT
254
25c
TO 26A
TO 26B

Fig. 7

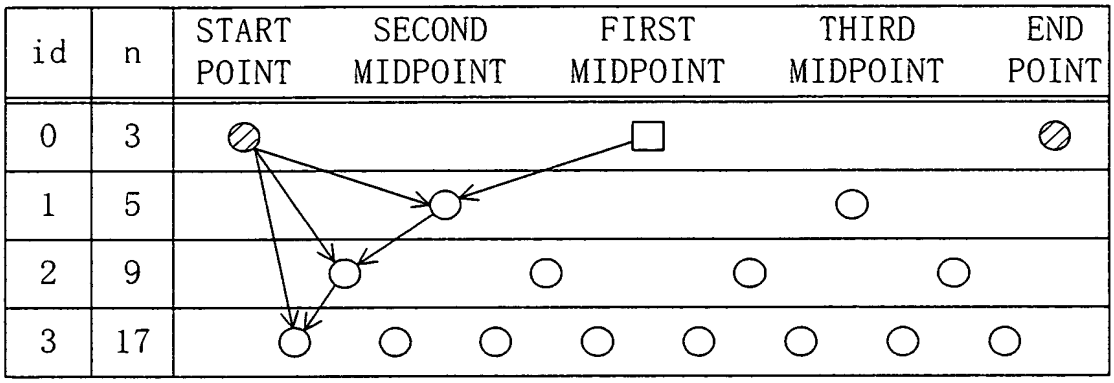
id
n
START POINT
SECOND MIDPOINT
FIRST MIDPOINT
THIRD MIDPOINT
END POINT
0
3
1
5
2
9
3
17

Fig. 8(a)

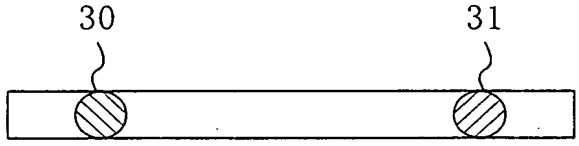

Fig. 8(b)

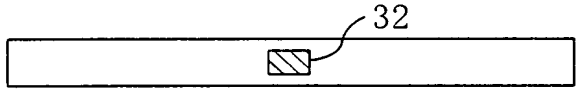

Fig. 8(c)

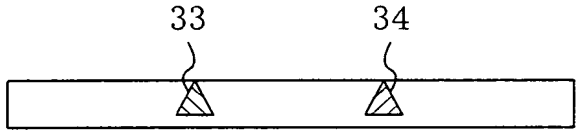

Fig. 8(d)

Fig. 9

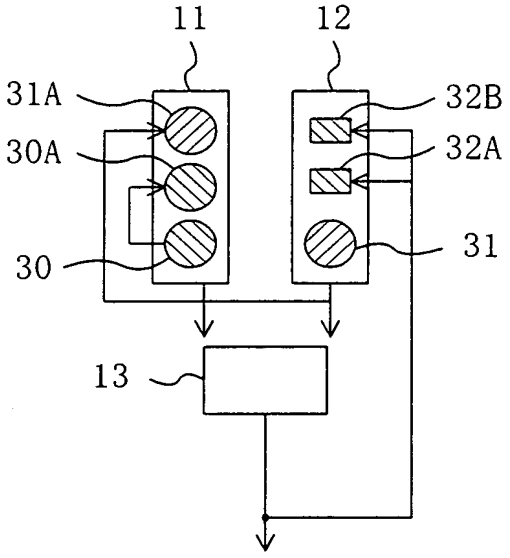

Fig. 10(a)

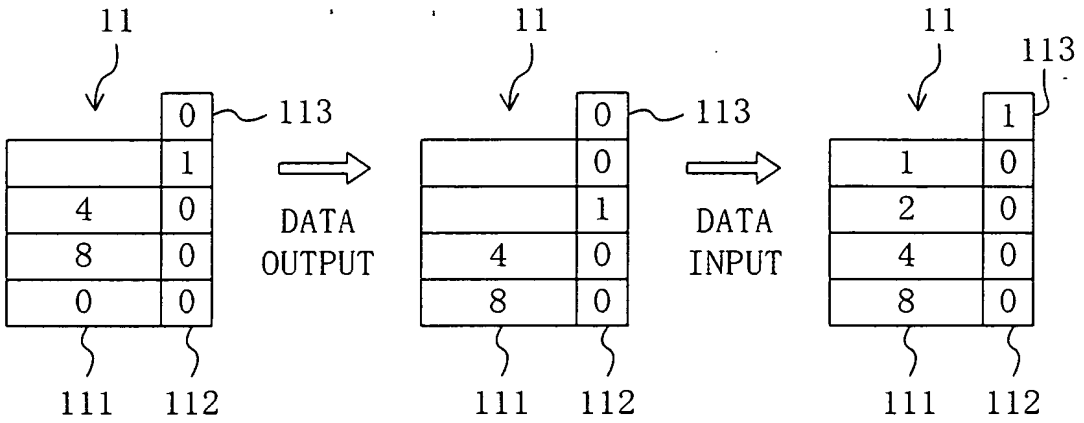

Fig. 10(b)

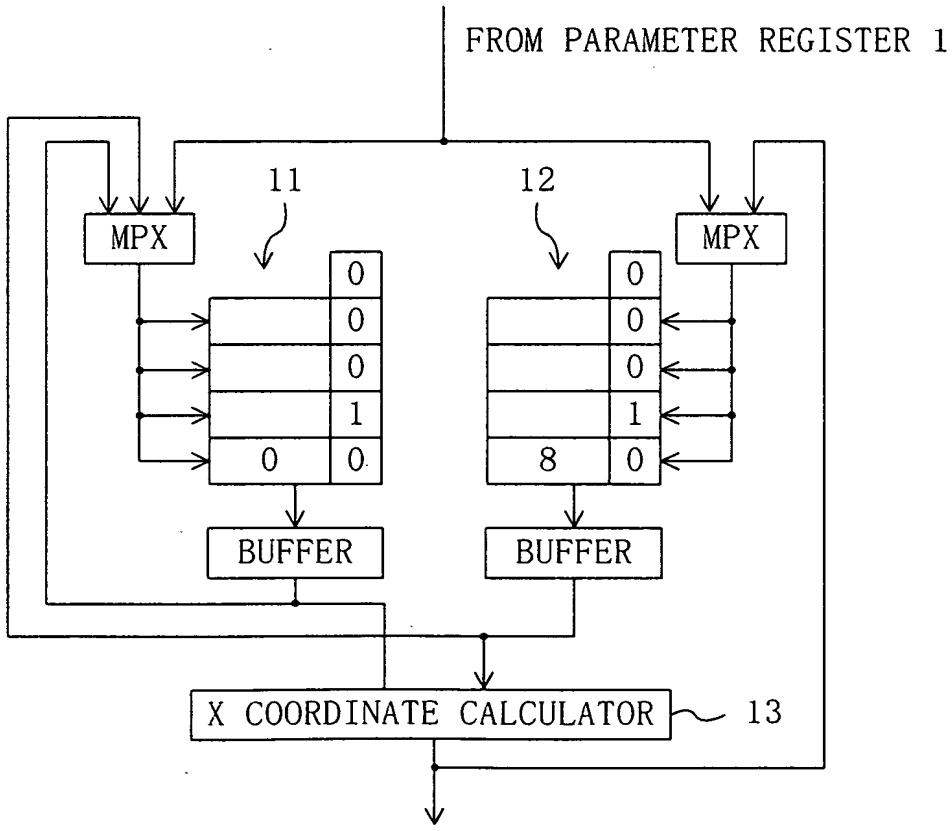

Fig. 11

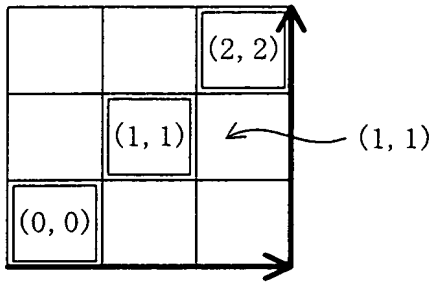

Fig. 12(a)

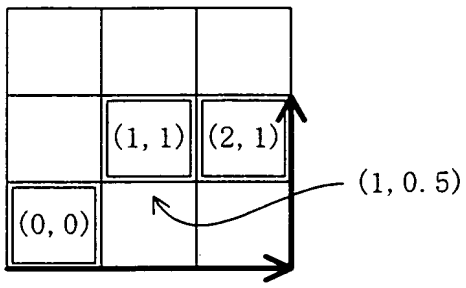

Fig. 12(b)

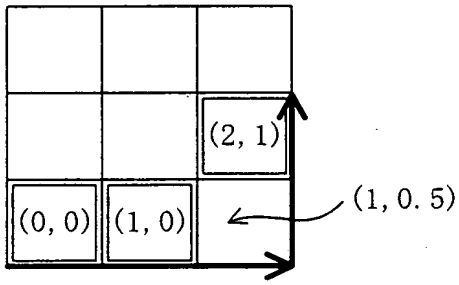

Fig. 13(a)

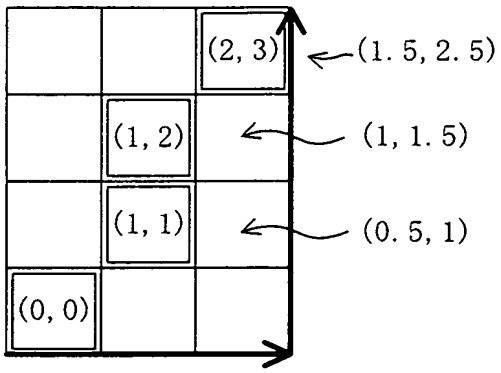

Fig. 13(b)

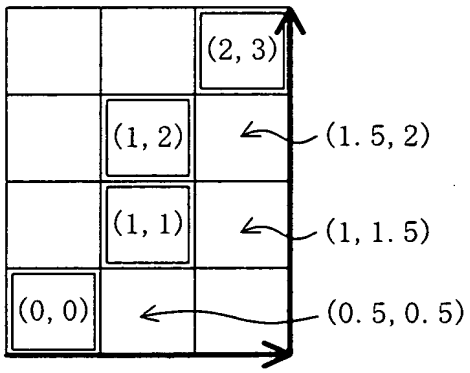

Fig. 14(a)

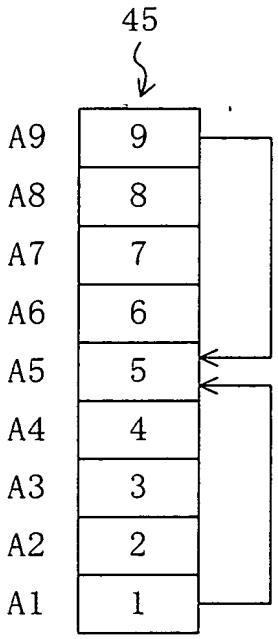

Fig. 14(c)

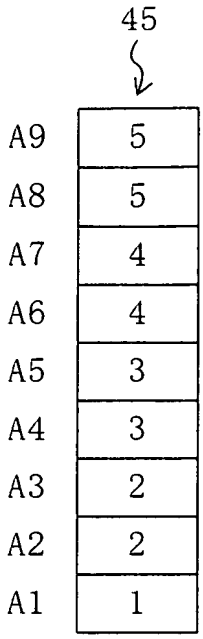

Fig. 14(b)

ORDER IN WHICH MIDPOINT COORDINATES ARE CALCULATED

$$1: \quad (A5) = \frac{(A1)+(A9)}{2}$$

$$2: \quad (A3) = \frac{(A1)+(A5)}{2}$$

$$3: \quad (A2) = \frac{(A1)+(A3)}{2}$$

$$4: \quad (A4) = \frac{(A3)+(A5)}{2}$$

$$5: \quad (A7) = \frac{(A5)+(A9)}{2}$$

$$6: \quad (A6) = \frac{(A5)+(A7)}{2}$$

$$7: \quad (A8) = \frac{(A7)+(A9)}{2}$$

Fig. 15

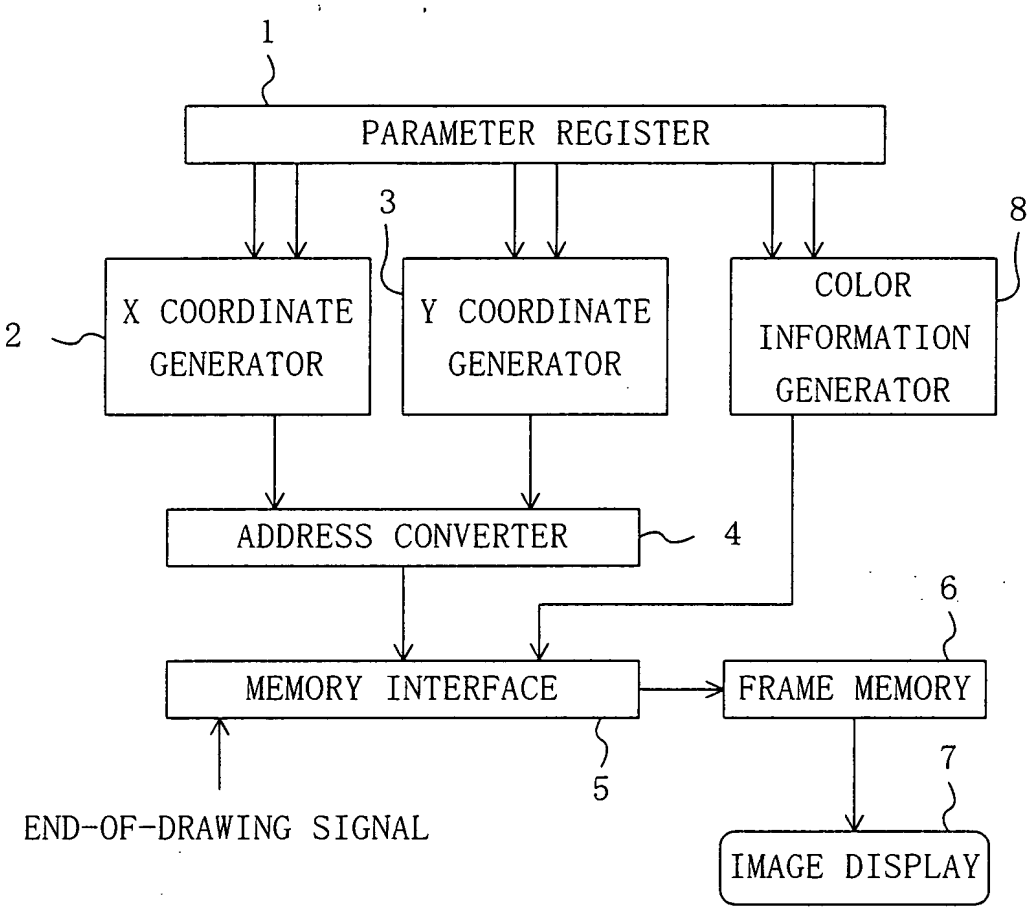
1
PARAMETER REGISTER
3
8
2
X COORDINATE GENERATOR
Y COORDINATE GENERATOR
COLOR INFORMATION GENERATOR
ADDRESS CONVERTER
4
6
MEMORY INTERFACE
FRAME MEMORY
5
7
END-OF-DRAWING SIGNAL
IMAGE DISPLAY

Fig. 16

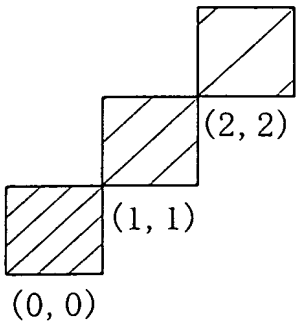
(2, 2)
(1, 1)
(0, 0)

Fig. 17

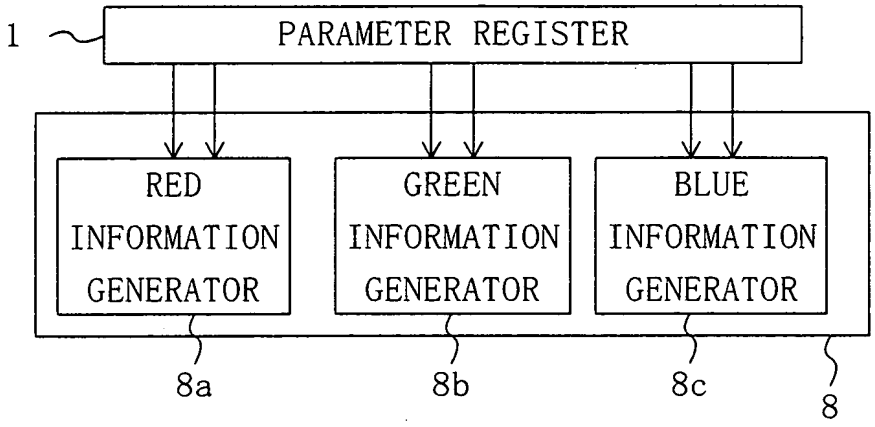
1
PARAMETER REGISTER
RED INFORMATION GENERATOR
GREEN INFORMATION GENERATOR
BLUE INFORMATION GENERATOR
8a
8b
8c
8

Fig. 18

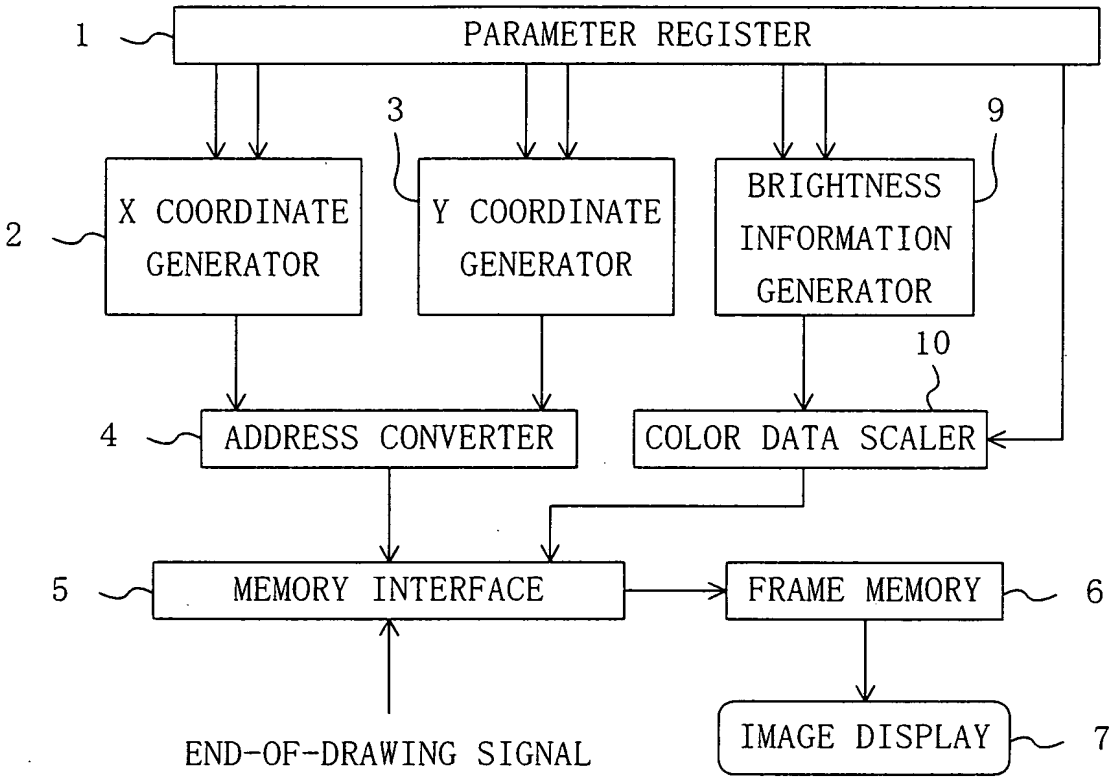
1
PARAMETER REGISTER
3
9
2
X COORDINATE GENERATOR
Y COORDINATE GENERATOR
BRIGHTNESS INFORMATION GENERATOR
10
4
ADDRESS CONVERTER
COLOR DATA SCALER
5
MEMORY INTERFACE
FRAME MEMORY
6
IMAGE DISPLAY
7
END-OF-DRAWING SIGNAL

Fig. 19

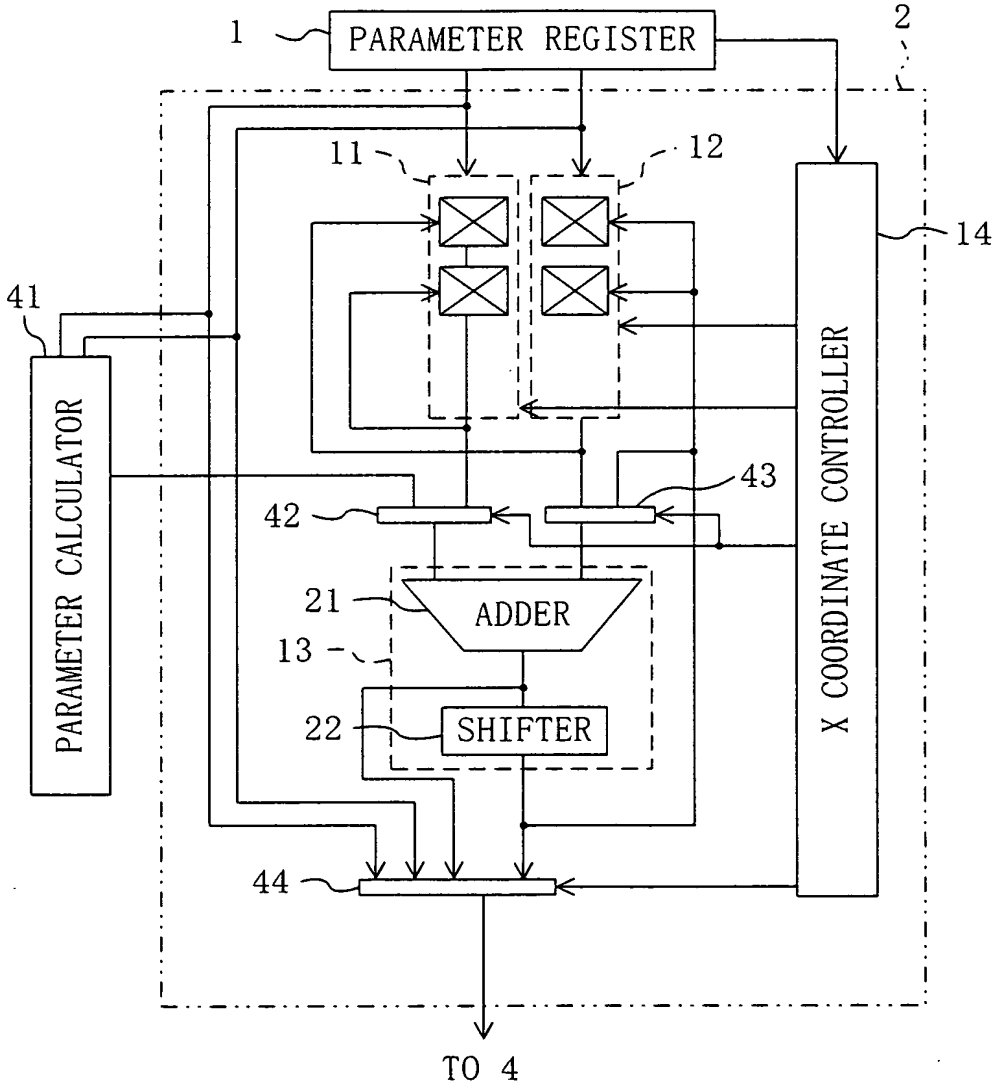
1
PARAMETER REGISTER
2
11
12
14
41
PARAMETER CALCULATOR
X COORDINATE CONTROLLER
43
42
21
ADDER
13
22
SHIFTER
44
TO 4

Fig. 20

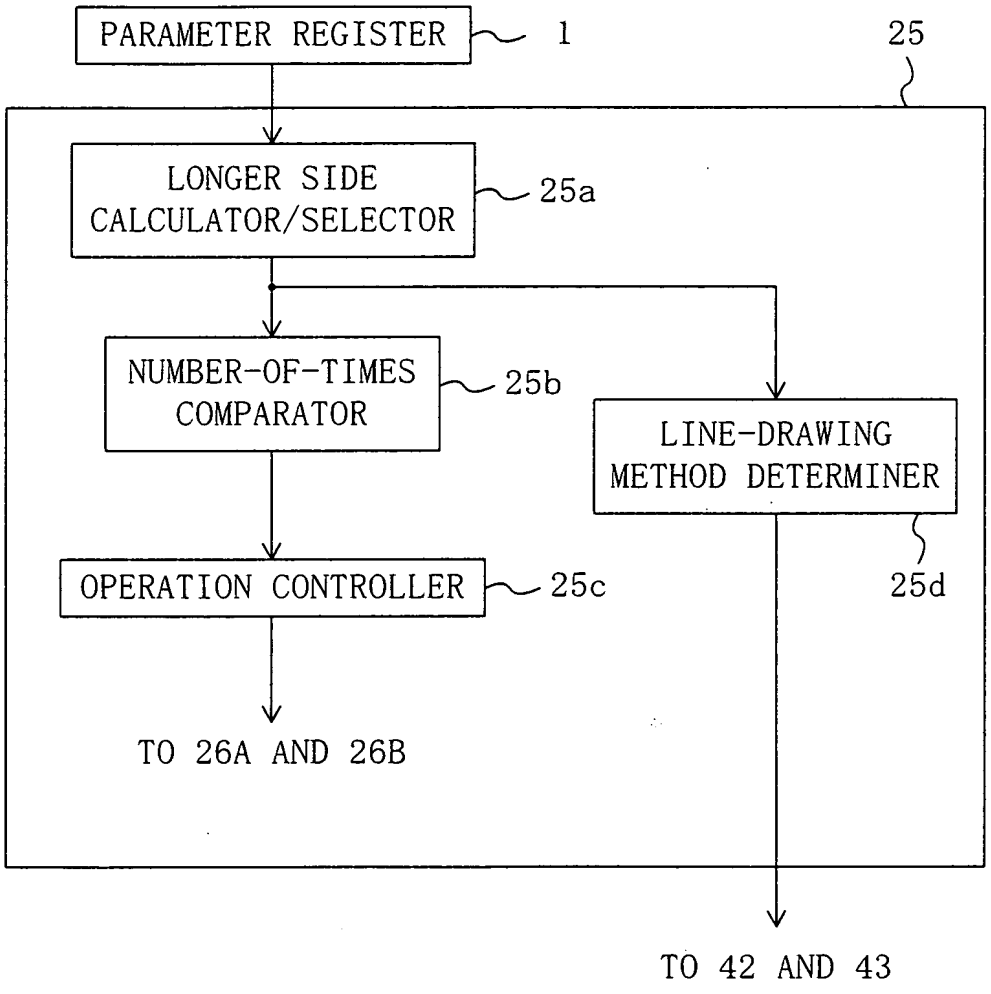
PARAMETER REGISTER
1
25
LONGER SIDE CALCULATOR/SELECTOR
25a
NUMBER-OF-TIMES COMPARATOR
25b
LINE-DRAWING METHOD DETERMINER
25d
OPERATION CONTROLLER
25c
TO 26A AND 26B
TO 42 AND 43

Fig. 21

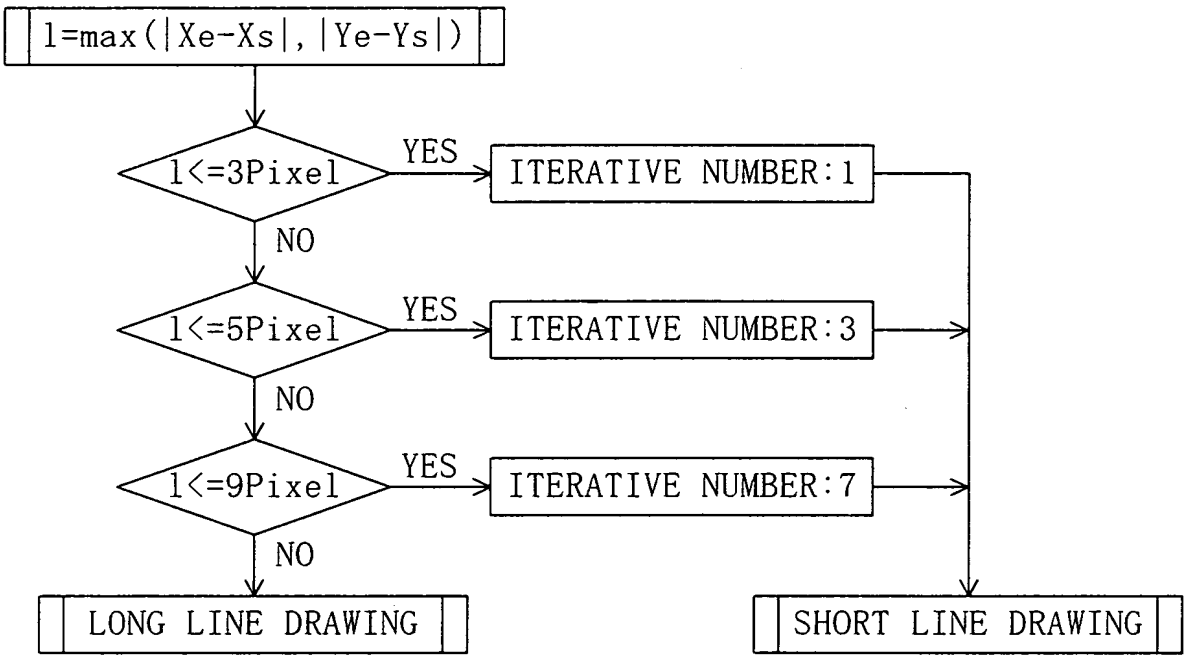
l=max(|Xe-Xs|,|Ye-Ys|)
l<=3Pixel
YES
ITERATIVE NUMBER:1
NO
l<=5Pixel
YES
ITERATIVE NUMBER:3
NO
l<=9Pixel
YES
ITERATIVE NUMBER:7
NO
LONG LINE DRAWING
SHORT LINE DRAWING

Fig. 22

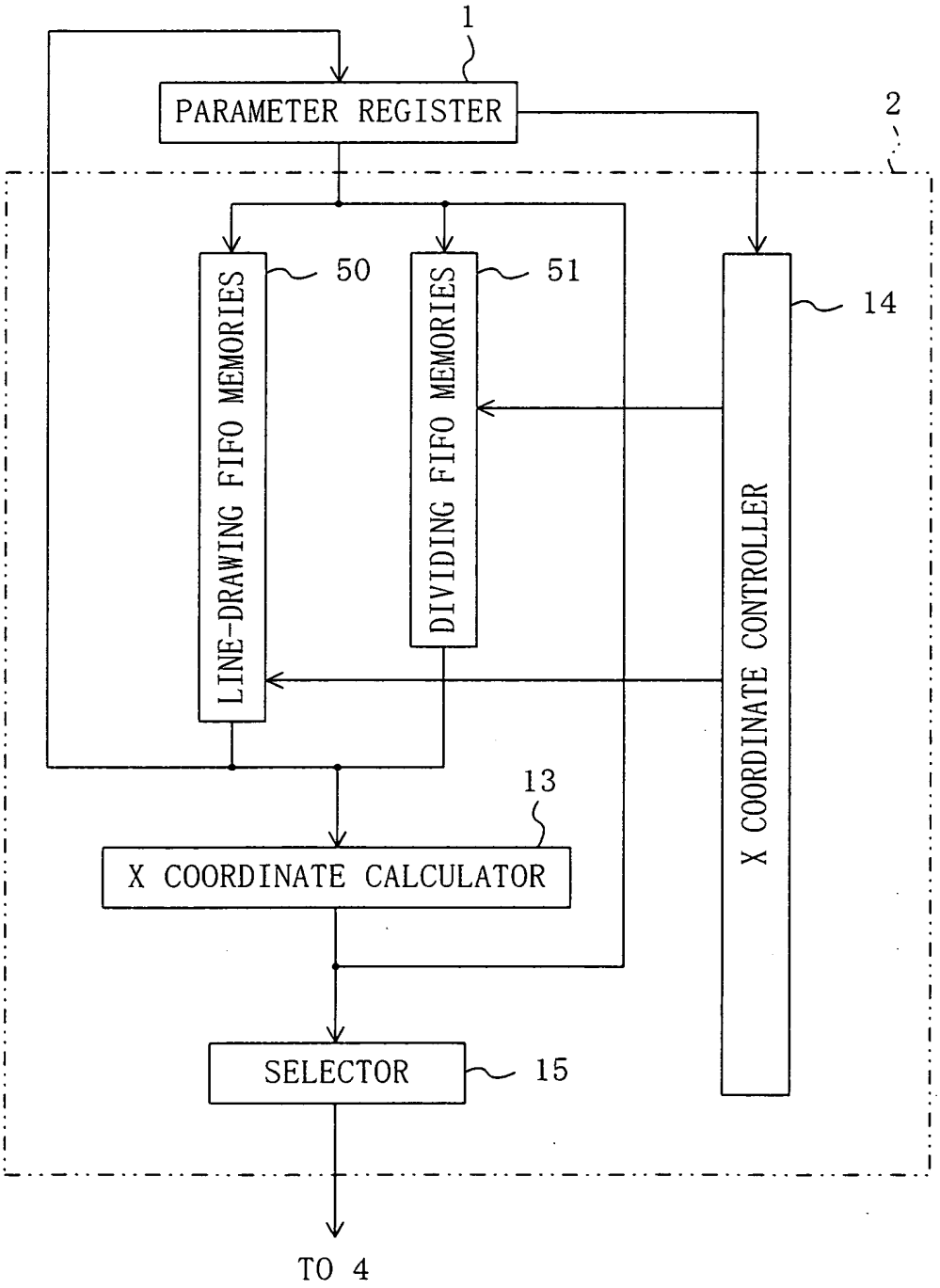
1
PARAMETER REGISTER
2
50
LINE-DRAWING FIFO MEMORIES
51
DIVIDING FIFO MEMORIES
14
X COORDINATE CONTROLLER
13
X COORDINATE CALCULATOR
SELECTOR
15
TO 4

Fig. 23(a)

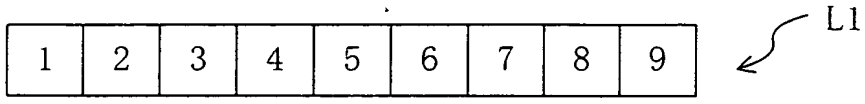

Fig. 23(b)

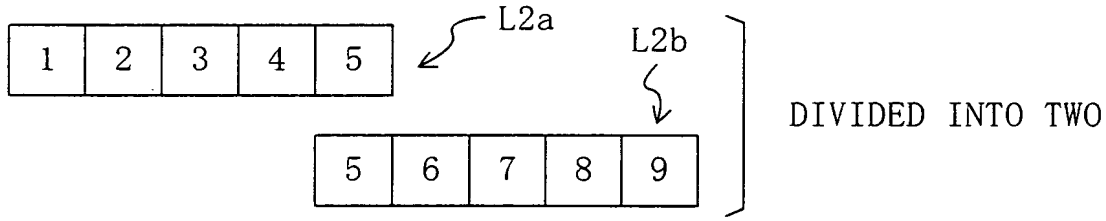

Fig. 23(c)

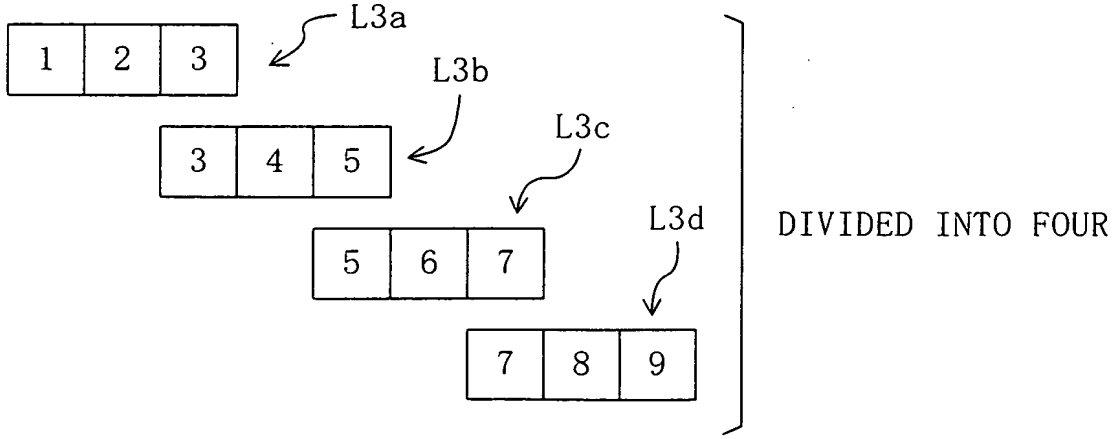

Fig. 24

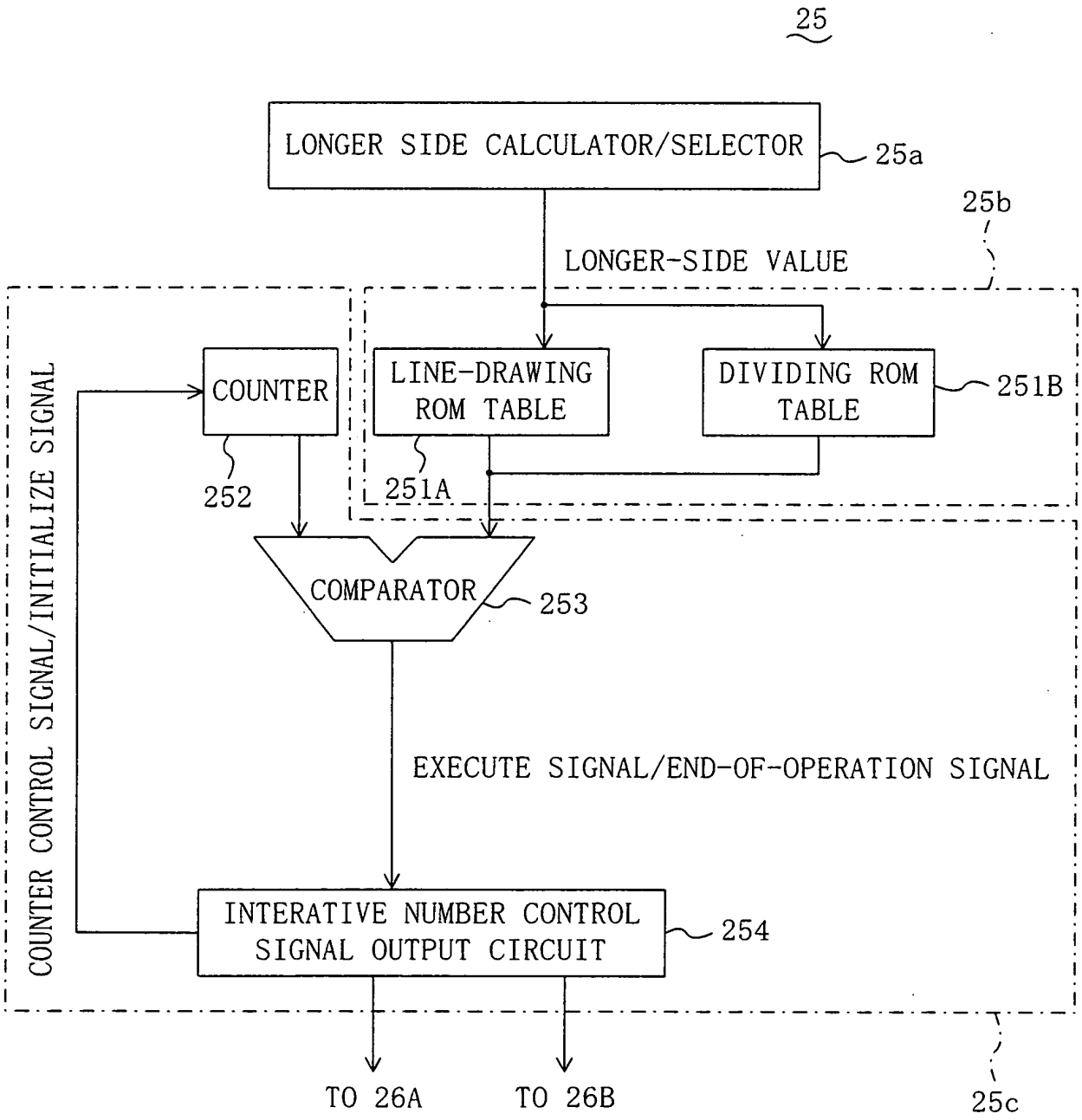
25
LONGER SIDE CALCULATOR/SELECTOR
25a
25b
LONGER-SIDE VALUE
COUNTER
LINE-DRAWING ROM TABLE
DIVIDING ROM TABLE
251B
252
251A
COMPARATOR
253
COUNTER CONTROL SIGNAL/INITIALIZE SIGNAL
EXECUTE SIGNAL/END-OF-OPERATION SIGNAL
INTERATIVE NUMBER CONTROL SIGNAL OUTPUT CIRCUIT
254
TO 26A
TO 26B
25c

Fig. 25

PRIOR ART

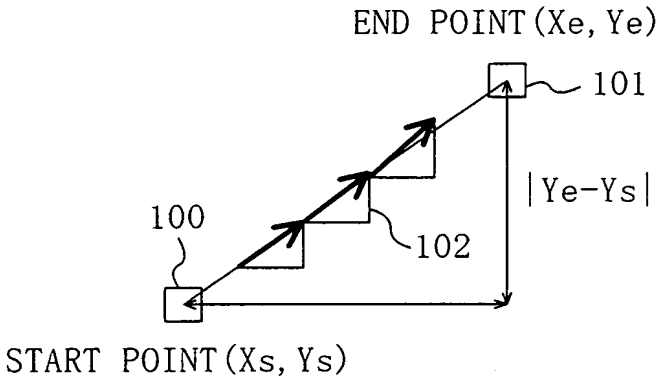

Fig. 26

PRIOR ART